Nicholas Vadivelu

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Experience

NVIDIA · Performance Software Engineering Intern *Aug 2020 – Present*

- Optimizing sparse BERT inference performance for **TensorRT** in **C++**, enabling a potential **50% reduction** in inference time, memory usage, and power usage for customers

Uber ATG · Research Intern *Jan 2020 – Aug 2020*

- Improved **object detection by 90%** (AP) and **motion forecasting by 22%** (L2) of a self-driving neural net under realistic positional error, significantly improving safety for future riders
- Wrote a **first author paper** on the learned positional error correction system (accepted at CoRL)

Google Brain · Software Engineering Intern *May 2019 – Aug 2019*

- Unlocked K-FAC for **over 370,000 users** by implementing and open sourcing automatic support for arbitrary neural network architectures and integrating it into the Keras ecosystem
- Enabled simple **multi-node, multi-GPU/TPU training** for users by incorporating **TensorFlow's** Distribution Strategy and efficient distributed operation placement
- Designed, created, and open-sourced idiomatic, reproducible training recipes for users while carefully considering hyperparameter ranges, baselines, datasets, and models

John Hancock Financial · Data Science Intern *May 2018 – Aug 2018*

- Achieved a **fraud detection rate of 63%** through designing an unsupervised ML model
- Deployed 25 fraud identifying rules in **SQL** that **correctly flagged 100+ out of 20,000+** claims
- Worked closely with clinicians to extract features from **5 new data sources** using **pandas**

Sunnybrook Research Institute · Software Developer Intern *Jul 2017 – Aug 2017*

- Improved MRI segmentation accuracy by **up to 80%** and reduced time to contour MRI scans from **~5 hrs to ~40 mins** by implementing techniques including watershed and clustering

Publications

Nicholas Vadivelu, Mengye Ren, James Tu, Jingkang Wang, Raquel Urtasun. Learning to Communicate and Correct Pose Errors. In *Conference on Robotics Learning (CoRL)*, Virtual, 2020

Pranav Subramani, **Nicholas Vadivelu**, Gautam Kamath. Enabling Fast Differentially Private SGD via Just-in-Time Compilation and Vectorization. In *NeuRIPS Privacy-Preserving Machine Learning Workshop*, Virtual, 2020

Open Source

PyTorch Ignite: Improved performance by **up to 63%** by designing and implementing **async updates for distributed metrics** with tests and documentation

Leadership

Data Science Club Lectures: Designed and presented workshops about neural networks in **TensorFlow**, machine learning in **scikit-learn**, and data cleaning in **pandas** for **300+ students**

WATonomous Design Team: Implemented real-time object detection in **Tensorflow, OpenCV**

Projects

Competitive Pokemon Analysis: Scraped, visualized, analyzed, and modeled Pokemon data with random forests, boosting trees, and Markov chains in **pandas**, **scikit-learn**, and **matplotlib**

Thrive Life Simulator: Created a **3D ray-casting game engine** from scratch for a dinosaur world simulation game in **Java** with **object-oriented design** and detailed documentation

Education

University of Waterloo · Computer Science & Statistics (B. Math) *2017 – 2022*

Cumulative GPA: 3.94/4.00 - Dean's List